the forms 5 names. The numerous plates are reproductions of fine photographs.

SMALL[14] has described a new species of *Anamomis* (*A. Simsonii*) from the Everglades of Florida. The only other species of the genus known to grow in the United States is the endemic *A. dicrana*, which occurs in a different part of Florida.

SMITH,[15] in continuation of his studies of Malayan orchids, has described 66 new species, representing 24 genera. *Basigyne* is described as a new genus.

STURGIS[16] has described new species of Myxomycetes, chiefly from Colorado, in *Physarum* (2), *Didymium*, and *Enteridium*.

SMITH,[17] in continuation of his studies of *Lupinus*, has monographed the Microcarpi, recognizing 6 species, although 14 specific names have been published. The discussion of *L. densiflorus* with its varieties is reserved for a later paper. The variable species of the 5 considered is *L. subvexus*, 8 new varieties being described.

WERNHAM,[18] in continuation of his studies of tropical American Rubiaceae, has described a new genus (*Raritebe*) from Colombia, resembling *Bertiera*, the new name being an anagram of the latter. New species are also described in *Psychotria* (2) and *Palicourea* (4).—J. M. C.

**Evaporation and soil moisture studies.**—The increasing amount of attention given to quantitative studies of the moisture factors of various plant communities is shown by several recent papers. Conspicuous among them is one by WEAVER,[19] reviewed elsewhere in this journal, in which he reports measurements of the evaporating power of the air and of soil moisture in both forest and grassland associations of southeastern Washington, leading to the conclusion that "evaporation rates and the amount of soil moisture in the various communities vary in general directly with the order of their occurrence in the succession, the climax community being the most mesophytic in both respects." With regard to the former factor it is further stated that "a study of the differences of the rate of evaporation in the various plant communities shows that

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14 SMALL, J. K., The genus *Anamomis* in Florida. Torreya **17**:221–224. *fig. 1.* 1917.

15 SMITH, J. J., Orchidaceae novae Malayensis. VIII. Bull. Jard. Bot. Buitenzorg II. no. 25. pp. 103. 1917.

16 STURGIS, W. C., Notes on new or rare Myxomycetes. Mycologia **9**:323–332. *pls. 14, 15.* 1917.

17 SMITH, CHARLES PIPER, Studies in the genus *Lupinus*. II. The Microcarpi, exclusive of *Lupinus densiflorus*. Bull. Torr. Bot. Club **45**:1–22. *figs. 16.* 1918.

18 WERNHAM, H. F., Tropical American Rubiaceae. X. Jour. Botany **55**:336–341. 1917.

19 WEAVER, J. E., A study of the vegetation of southeastern Washington and adjacent Idaho. Univ. Neb. Studies **17**:no. 1. pp. 114. *figs. 48.* 1917.

these differences are sufficient to be important factors in causing succession, at least through the earlier stages, where light does not play an important rôle." These conclusions are supported by adequate data obtained in a region exhibiting a wide range of conditions, with successions comprising a considerable number of stages, and agree closely with the conclusions of the reviewer drawn from data obtained in northern Indiana.[20] These conclusions meet with the approval of CLEMENTS,[21] who admits evaporation to be a cause of succession since it affects the available moisture supply of the habitats.

Another investigation of the same moisture factors by WEAVER and THEIL,[22] while primarily concerned with contrasting the evaporating rates and soil moisture conditions of forest and grassland and demonstrating the greater xerophytism of the latter in both Minnesota and Nebraska, agrees perfectly in its conclusions regarding the relationship of these factors to succession with those of WEAVER already cited. It would also appear from the data contained in this report that the rather high evaporating power of the air in these grassland communities, together with the frequent lack of growth water during the growing season, may in a large measure account for the absence of trees in these regions except along the streams or in other more humid situations. The investigation thus forms a contribution to our scanty knowledge of the factors involved in causing the development of prairies.

GATES,[23] measuring the evaporating power of the air in various plant associations in Michigan, has obtained data that are quite similar to those of the investigators cited, but he reaches an almost directly opposite conclusion that the different rates of evaporation are the result and not the cause of succession. This disagreement with the conclusions of WEAVER and with those of the reviewer, both supported by larger quantities of data, seems to be due not so much to a confusion of cause and effect as to the facts that (1) GATES's investigation was conducted in a region much more humid than those studied by the other workers, as shown by maximum rates of evaporation obtained by WEAVER being three times and those by the reviewer at least twice those shown in Michigan; (2) the more humid climate exhibits a successional series much shorter than those in Washington and Indiana; and (3) GATES does not consider soil moisture conditions which would probably show all of his habitats to be decidedly mesophytic.

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[20] BOT. GAZ. **58**:232. 1914.

[21] CLEMENTS, F. E., Recent investigations on evaporation and succession. Plant World **20**:357–361. 1917.

[22] WEAVER, J. E., and THIEL, A. F., Ecological studies in the tension zone between prairie and woodland. Bot. Survey Neb. N.S. **1**:pp. 60. *figs. 38.* 1917.

[23] GATES, F. C., The relation between evaporation and plant succession in a given area. Amer. Jour. Bot. **4**:161–178. 1917.

In spite of this disagreement as to conclusions, however, GATES's investigation is to be welcomed as being carefully made and as adding to our knowledge of the moisture relations of various plant communities.—GEO. D. FULLER.

**Germination.**—LESAGE[24] has made a rather extensive study of the effect of various conditions and reagents upon the germination of seeds of *Lepidium sativum*. He finds a selectively permeable membrane surrounding the seed, as has been found for many other seeds. This is shown by the fact that the yellow pigment of the seeds diffuses out when the integrity of the membrane is destroyed by mutilation of the seeds or by treating them with dilute potassium hydrate solutions. The exosmose of the pigments occurs in hydrate solutions considerably more dilute ($\frac{1}{64}$ mol.) than those completely inhibiting germination ($\frac{5}{64}$ mol.). The data on the life duration of seeds, soaked in various concentrations of ethyl alcohol and aqueous solutions of salts followed by thorough washing in distilled water, are of great interest. Absolute alcohol did not injure these seeds after 4 years and 7 months soaking, and the life durations in various percentages are as follows:

| | | | |
|---|---|---|---|
| 94 per cent ........ | 2–3 months | 33 per cent ........ | 2 hours |
| 85 " " ........ | 50–90 hours | 8 " " ........ | 4 days |
| 75 " " ........ | 20 hours | 5 " " ........ | 16 days |
| 65 " " ........ | 6–7 hours | | |

If these data are plotted into a curve with the duration on the ordinates and the concentrations on the abscissae, the upward face of the curve is concave. A similar relation between toxicity and concentration holds for several salts that were studied. For NaCl and KCl solutions the highest toxicity (shortest life duration in the solution) was in 1–2 mol., and for $NH_4Cl$ in 2–3 mol., higher concentrations proving less and less toxic as the concentration increased. For $NaNO_3$ the greatest toxicity lay between 2 and 4 mol., while for $NH_4NO_3$ it was between 1.25 and 6 mol. At the point of saturation, about 2 mol., $KNO_3$ had not reached its maximum toxicity. The seeds were not killed by 20 days' soaking in any concentration of $Na_2SO_4$, while $(NH_4)_2SO_4$ showed its maximum toxicity at 2 mol.

The seeds still germinated after 4 years and 8 months soaking in petrol ether, but were quickly killed when soaked in ethyl ether. They germinated fairly well in moist air if it was saturated, but not at 98 per cent saturation. Temperature was an important factor here, 21° C. being the optimum. There is evidently a rest period in these seeds, for seeds one month old would not germinate in saturated atmosphere after 25 days, while 1-, 2-, 3-, 4-, and 5-year old seeds began to germinate after 3 days. Seeds that did not germinate after 5 months in saturated air still retained their vitality.

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[24] LESAGE, PIERRE, Au voisinage des limites de la germination dans les graines de *Lepidium sativum*. Rev. Gen. Bot. **29**:97–112, 137–157, 181–192. 1917.